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PATENT ABSTRACTS OF JAPAN

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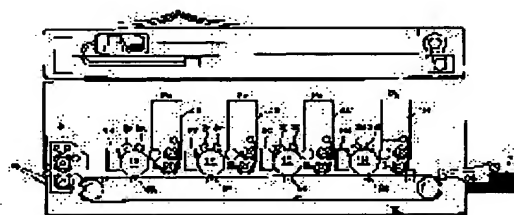
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ITO MASAHIRO

(54) IMAGE FORMING DEVICE**(57)Abstract:**

PURPOSE: To provide an image forming device constituted so that color mixture generated in the cleanerless system image forming device and caused by a retransfer action is prevented from occurring and an image whose color tone is not changed can be maintained.

CONSTITUTION: The image forming device is provided with a developing means 4 forming a toner image by forming a latent image on a uniformly electrostatically charged image carrier 1 and developing it by developer which is carried by a developer carrier and which includes spherical toner and carrier and plural image forming units P used also as a cleaning means recovering residual toner particulates left on the carrier 1 after the toner image is transferred on a transfer material by the developing means 4 in a line along a carrying belt 10 and constituted so as to form the image by carrying the transfer material by the belt 10 and passing it through an image forming part. Then, the proportion of an area covered with additive added to the toner particulates is set to be $\geq 15\%$ with respect to the surface area of one toner particulate.

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CLAIMS

[Claim(s)]

[Claim 1] It has a development means to form a latent image in homogeneity at image support by which electrification processing was carried out, and to develop this latent image and to form a toner image with a developer containing a globular form toner supported by developer support and a carrier. An image formation unit which serves also as a cleaning means to collect ** toner particles which remained to this image support after this development means imprints this toner image to imprint material In image formation equipment which is installed successively along with a conveyance belt, conveys imprint material by this conveyance belt, is made to pass said image formation unit, and forms an image [two or more] Image formation equipment characterized by the percentage of area covered with an external additive **(ed) by this toner particle outside to surface area of this toner 1 particle being 15% or more.

[Claim 2] Image formation equipment according to claim 1 characterized by installing these image formation units successively in accordance with an endless-like middle imprint object.

[Claim 3] Image formation equipment according to claim 1 or 2 with which shape factor SF-1 of this globular form toner is characterized by ranges of 100-140, and SF-2 being 100-120.

[Claim 4] This globular form toner particle is image formation equipment according to claim 1 to 3 characterized by being manufactured by polymerization method.

[Claim 5] Image formation equipment according to claim 1 with which a rate of area covered with an external additive **(ed) by this toner particle outside to surface area of this toner particle is characterized by being 50% or less 15% or more.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the image formation equipment which develops with a developer the electrostatic latent image formed in image support corresponding to the recorded image, and records it on a form etc.

[0002]

[Description of the Prior Art] Image formation equipment as shown in drawing 2 while the requests to the further improvement in the speed and high-definition-izing mount is devised with the spread of digital color copying machines. This image formation equipment is digital color picture formation equipment of the electrophotography method which prepares the image formation section (image formation unit) for every developer of four colors respectively, forms the visible image for every color in the image formation process later mentioned to the photoconductor drum as image support in each image formation section, carries out a sequential imprint at the imprint material to which these visible images are supplied from the outside, carries out package fixing and obtains a color picture. The greatest advantage of this method is being able to accelerate.

[0003] This color picture formation equipment is equipped with the four image formation sections, the 1st, the 2nd, the 3rd, and the 4th, PM, PC, PY, and PK in the main part of equipment, and the feed section 7 is arranged in the right-hand side of that end, i.e., drawing 2, and the fixing machine 8 is arranged in that opposite side, i.e., the left-hand side of drawing 2, respectively. Moreover, in an endless-like imprint material conveyance means to convey imprint material, and this conventional example, the conveyance belt 10 is ****(ed) among two or more rollers in a well-known mode by the path bottom to said fixing assembly 8 from said feed section 7 within the main part of a printer.

[0004] This conveyance belt 10 is driven in the direction shown by the illustration arrow head, supports the imprint material fed through said feed section, and carries out sequential conveyance to each image formation sections PM, PC, PY, and PK mentioned above.

[0005] Each image formation sections PM, PC, PY, and PK have the same configuration substantially. The photoconductor drums 1M, 1C, 1Y, and 1K which are the image support by which a rotation drive is carried out are included in the direction of an illustration arrow head like usual. Around each photoconductor drum A photoconductor drum The image aligners 3M, 3C, and 3Y which form an electrostatic latent image on the primary electrification machines 2M, 2C, and 2Y which carry out uniform electrification, and a 2K; photoconductor drum, and the development counters 4M, 4C, 4Y, and 4K which develop the electrostatic latent image formed on the 3K; photoconductor drum; the developed visible image The corona-electrical-charging machines 6M, 6C, 6Y, and 6K imprinted to imprint material; sequential arrangement of the drum cleaners 5M, 5C, and 5Y and 5K** which remove the toner which remains on a photoconductor drum is carried out in the drum hand of cut.

[0006] The toner of a cyanogen color is held in development counter 4M, and the toner to development counter 4K with the black toner of a yellow color is held for the toner of a Magenta color in development counter 4Y by development counter 4C, respectively. Said image aligners

3M, 3C, 3Y, and 3K It is the LED arm head which put the LED light emitting device in order in the direction of a bus-bar of a drum in this example. By image sensor like CCD for colors, it is decomposed into many pixels and read. Receive the input of the digital pixel signal over the image of each color changed into the digital signal, and a drum side is exposed corresponding to this signal among said primary electrification machines 2M, 2C, 2Y, and 2K and development counters 4M, 4C, 4Y, and 4K. The electrostatic latent image of a corresponding color is formed. The pixel signal corresponding to the black component image of a color picture in the pixel signal corresponding to the yellow component image of a color picture in the pixel signal corresponding to the cyanogen component image of a color picture in the pixel signal corresponding to the Magenta component image of a color picture in image aligner 3M is inputted into image aligner 3K at image aligner 3C at image aligner 3Y, respectively. Moreover, between the first image formation section PM and the feed section, opposite installation of the adsorption zone electrical machinery of the pair for adsorbing imprint material is carried out on both sides of the conveyance belt 10. On the other hand, the electrification machine for electric discharge is formed between the 4th image formation section PK and a fixing assembly 8, and in order to separate the imprint material by which the conveyance belt 10 is adsorbed, alternating voltage is impressed from a power supply (not shown).

[0007] In the color printer of the above-mentioned configuration, electrostatic adsorption is carried out and the imprint material to which paper was fed on the conveyance belt 10 from the sheet paper cassette 7 is conveyed with migration in the direction of an illustration arrow head of the conveyance belt 10. conveyance of imprint material — following — photoconductor drum 1M of the first image formation section PM — the toner image of a Magenta — the toner image of yellow is shared with photoconductor drum 1Y of the 3rd image formation section PY, a black toner image is shared with photoconductor drum 1K of the 4th image formation section PK by photoconductor drum 1C of the 2nd image formation section PC, respectively, and the toner image of cyanogen is developed according to an electrostatic latent image.

[0008] A development production process is explained here. How (1 component non-contact development) to coat the development method with a blade etc. on a sleeve about a nonmagnetic toner, coat and convey a magnetic toner with magnetic force, and develop in the state of non-contact to a photoconductor drum generally, How (1 component contact development) to develop the toner coated as mentioned above in the state of contact to a photoconductor drum, It is divided roughly into four kinds of the method (2 component contact development) of conveying with magnetic force, using as a developer what mixed the magnetic carrier to the toner particle, and developing in the state of contact to a photoconductor drum, and the method (2 component non-contact development) of changing the above-mentioned two component developer into a non-contact condition, and developing it. From the field of high-definition-izing of an image, or high stability, many 2 component contact developing-negatives methods are used.

[0009] Drawing 3 is the schematic diagram of the developer 4 for 2 component MAG brush development in this conventional example. The regulation blade arranged in order that the magnet roller by which 16 had been placed in a fixed position by the development sleeve among drawing, and 17 has been placed in a fixed position in a development sleeve, and 18 and 19 may carry out a developer at a stirring screw and 20 may carry out thin layer formation on the development sleeve surface, and 21 are development containers. The development production process which develops said electrostatic latent image by the 2 component MAG brush method using the above-mentioned developer, and the circulatory system of a developer are explained below here.

[0010] First, in S2 pole →N1 pole and the process conveyed, the developer pumped up with rotation of the development sleeve 16 on the N3 pole is regulated by the regulation blade 20 perpendicularly arranged to the development sleeve 16, and thin layer formation is carried out on the development sleeve 16. If the developer by which thin layer formation was carried out here is conveyed on the development main lobe S1 pole, a chain-like cluster will be formed of magnetic force. Said electrostatic latent image is developed with the developer formed in spicate [this], and the developer on the development sleeve 16 is returned in the development container 21 by

the repulsion magnetic field of N3 pole and N2 pole after that.

[0011] Direct-current bias and AC bias are impressed to the development sleeve 16 from a power supply (not shown). If AC bias is generally impressed in the 2 component developing-negatives method, although the increase of development effectiveness and an image become high definition, they will also produce risk of saying that it becomes easy to generate a fogging conversely.

[0012] Thus, the toner image developed on the photoconductor drum migration of the conveyance belt 10 — imprint material — the 1-, while passing the lower part which are the photoconductor drums 1M-1K of 4th image formation section PM-PK one by one and being conveyed in the direction of the fixing section It imprints in piles one by one on imprint material with the imprint electrification vessels 6M, 6C, 6Y, and 6K of each image formation section, and a color picture is compounded. After imprint material passes the 4th image formation section PM, it is discharged with the electrification vessel for electric discharge with which alternating voltage was impressed, and is separated from the conveyance belt 10. The imprint material separated from the conveyance belt 10 is discharged from an imprint material exhaust port to a tray 9, after being fixed to the image imprinted by the fixing assembly 8.

[0013] On the other hand, the transfer residual toner has adhered to the field of the photoconductor drum after a toner image imprint, and since it will become image dirt and will appear at the time of next image formation if this is in the following imprint production process, a transfer residual toner is discharged from drum lifting with the drum cleaner 5, and is sent to the waste toner box put side by side. In this conventional example, the method of contacting an elastic blade to a photoconductor drum and failing to scratch a toner is used.

[0014] However, considering an environmental side and the troublesomeness of a maintenance, it is not not much desirable that a waste toner comes out. Moreover, by one side, the demand of the miniaturization to OA equipment, such as a copying machine, from a space-saving point is increasing.

[0015] There is development coincidence cleaning as one of the methods of solving these problems at once. The example using this method is shown in drawing 4. This is the method of fogging the transfer residual toner of the non-image section in the development production process of next image formation, and collecting in a development container with picking potential in the reversal development process of making the exposure section developing a toner. Since it is again mixed with a carrier and the collected toner is used for image formation, taking out a waste toner is lost. Since a drum cleaner becomes unnecessary at coincidence, a miniaturization becomes possible. Especially in the image formation equipment which has two or more image formation units of the same configuration like especially this conventional example, it is clear that it is effective in a miniaturization.

[0016] This process is briefly explained using drawing 5. This drawing expresses typically the potential of drum lifting after (1) imprint, (2) electrifications, (3) exposure, and (4) development, and arrangement of a toner. It is the potential difference [as opposed to / as opposed to / in VD / the potential of drum lifting / the development sleeve of the potential of the image section, and the potential of the non-image section in VC and Vb], respectively. Since a transfer residual toner is influenced of the corona discharge at the time of an imprint, the so-called reversal toner which polarity reversed is also contained [after (1):imprint]. However, a reversal toner is normalized at the same time electrification processing of the photoconductor drum is carried out [after (2):electrification]. It is covered with the toner which a new latent image was formed and has adhered to the non-image section [after (3):exposure], and it is recovered by the picking potential Vb in a development container [after (4):development]. However, when there are many transfer residual toners, at the time of electrification, electrification nonuniformity may arise, or it may be shaded and a latent image may be disturbed. For this reason, it is indispensable to use for development coincidence cleaning the globular form toner with the high recovery effectiveness at the time of development which is high imprint effectiveness. Since a globular form toner is charged in homogeneity with a contact opportunity with a carrier to electrostatic adhesion force committing this strongly at the time of contact to a drum since it is restricted to a height that a non-globular form toner has a carrier and a contact opportunity and the height is

locally charged in high density without the whole surface of 10,000 **, the electrostatic adhesion force at the time of contact to a drum is because it becomes weak to a non-globular form toner. Moreover, a globular form toner rolls compared with a non-globular form toner, and is also a cause with recovery effectiveness sufficient [that a sex is also high].

[0017]

[Problem(s) to be Solved by the Invention] When a cleaner loess method is used for the image formation equipment which installed two or more image formation units successively along with the conveyance belt, the problem of the color mixture by re-imprint occurs. Since these will be collected by the development counter of the color from which the toner of a different color already imprinted on imprint material adheres to drum lifting, and differs from on an imprint according to the adhesion force between a toner and a drum, and the repulsive force produced between imprint material in order that polarity may be reversed with an imprint electrification vessel at the time of the imprint after a two-color eye, they happens. It becomes difficult for this color mixture to advance for every image formation, and to reproduce an exact color tone.

[0018] This invention is made in view of the above situations, the color mixture by re-imprint is prevented, and it aims at offering the image formation equipment which can maintain an image without change of a color tone.

[0019]

[Means for Solving the Problem and its Function] It has a development means for this invention to form a latent image in homogeneity at image support by which electrification processing was carried out, and to develop this latent image and to form a toner image with a developer containing a globular form toner supported by developer support and a carrier. An image formation unit which serves also as a cleaning means to collect ** toner particles which remained to this image support after this development means imprints this globular form toner image to imprint material In image formation equipment which is installed successively along with a conveyance belt, conveys imprint material by this conveyance belt, is made to pass said image formation unit, and forms an image [two or more] It is related with image formation equipment characterized by the percentage of area covered with an external additive **(ed) by this toner particle outside being 15% or more to surface area of this toner 1 particle.

[0020] Moreover, this invention is replaced with a conveyance belt in the above-mentioned image formation equipment, and relates to image formation equipment with which the above-mentioned image formation units are installed successively in accordance with this middle imprint object using an endless-like middle imprint object.

[0021] Detailed explanation of this invention equipment is given in the following examples.

[0022]

[Example]

(Example 1) Since what has an image formation process [the fundamental configuration of the color picture formation equipment in the example 1 of this invention is the same as that of drawing 4 in the conventional example, and be / the same as that of the development coincidence cleaning in the conventional example / it] was used, the explanation about it is omitted here.

[0023] In order to solve the above and the trouble of color mixture, as a result of examining how to reduce a re-imprint, it turned out that it depends for the re-imprint on the rate of the area covered by the external additive which the toner surface to the surface area of a toner particle added to the toner, i.e., coverage, greatly. Although there was usually improvement in the fluid improvement in a developer, improvement in electrification grant nature, the stability of the amount of electrifications to an environmental variation, and the imprint nature by reduction of the adhesion force to a drum etc. as an effect of an external additive, when it became the range which the coverage of a toner mentions later, it turned out also to re-imprint prevention that it is very effective.

[0024] In this invention, that 100-140, and whose SF-2 shape factor SF-1 of a toner is 100-120 is used suitably, and that 100-130, and whose SF-2 SF-1 is 100-115 is good more preferably. In SF-1 which shows the shape factor used for this invention, and SF-2, the toner was sampled to 100-piece random using Hitachi FE-SEM (S-800), and the image information analyzed by having

introduced into the image-analysis equipment made from NIKORE (Luzex3) through the interface, and defined the value which might be computed from the bottom type as shape factor SF-1 and SF-2 in this invention.

[0025]

[Equation 1]

$$SF - 1 = \frac{(MXLNG)^2}{AREA} \times \frac{\pi}{4} \times 100$$

$$SF - 2 = \frac{(PERI)^2}{AREA} \times \frac{1}{4\pi} \times 100$$

(AREA: Toner projected area, MXLNG: absolutely maximum length, PERI: perimeter)

[0026] Shape factor SF-1 of a toner shows a globular form degree, and if larger than 140, it will become an indeterminate form from a globular form gradually. SF-2 show a concavo-convex degree, and if larger than 120, they will become remarkable [the irregularity of the surface area of a toner].

[0027] It is lowering the effect of the photo conductor live-part material to the toner surface as much as possible as an operation effect of a toner configuration, and suppressing generation of a reactant low molecular weight constituent in a toner. That is, as small the globular form of toner surface area as possible is desirable.

[0028] When a part or the whole of a toner uses the toner formed by the polymerization method, the effect of this invention can be heightened. Since the portion which starts especially as for the toner surface is made to exist as a pre toner (monomer constituent) particle in a dispersion medium about the toner formed by the polymerization method and a polymerization reaction generates a required portion, what was graduated considerably can be obtained about surface nature. If SF-1 exceeds 140 or SF-2 exceed 120, a fogging may increase or endurance may be inferior a little.

[0029] Furthermore, the core/shell structure of a toner can be given, and the toner used for the image formation equipment of this invention can be manufactured still more easily by using a toner which was formed of the polymerization in the shell portion. In this semantics, the toner which has a core/shell structure is preferably used for this invention. It cannot be overemphasized that blocking resistance can be given without an operation of a core/shell structure spoiling fixable [which was excellent in the toner].

[0030] The result of having evaluated the amount of re-imprints in the coverage and the optimal imprint current value when using a silica (SiO₂) with a mean particle diameter of 20nm as an external additive as the first embodiment of an example 1 using the globular form toner (SF-1 being 108 and SF-2 being 108) manufactured by the suspension-polymerization method is shown in a table 1. The thing excellent in the mold-release characteristic is used for the emergency with the surface layer which distributed the Teflon particle in the outermost layer at the photo conductor.

[0031] A degree type can express coverage in a toner almost near a globular form which is used for this invention.

[0032]

[Equation 2]

$$R = \frac{r_t \cdot d_t}{4 \cdot r_a \cdot d_a} \cdot A$$

[0033] For R, the coverage of the external additive on the surface of a toner and A are [the average radius (micrometer) of a toner, specific gravity (g/cm³), and r_a and d_a of outside **** (wt%), and r_t and d_t] the average radii (micrometer) and specific gravity (g/cm³) of an external additive(%) here, respectively. However, when an external additive forms an aggregate, r_a serves as an average radius of an aggregate.

[0034] A table 1 showed stopping generating a re-imprint, when the coverage of the external additive on the surface of a toner was 15% or more.

[0035] The result of having evaluated the amount of re-imprints in the coverage and the optimal

imprint current value at the time of using titanium oxide (TiO₂) with a mean particle diameter of 50nm as an external additive as the second embodiment of an example 1 is shown in a table 2. When the coverage of an external additive was 15% or more also in the second example, generating of a re-imprint was lost.

[0036] The above thing shows depending for the amount of re-imprints on the coverage to the quality of the material or not particle size but the toner surface of an external additive most greatly, when the globular form polymerization toner by the suspension-polymerization method is used. Although considering the endurance of a developer it is so advantageous that there is much outside **** in order to maintain the external additive effect and to obtain the stable rate of a re-imprint, evils, such as a fall of the amount of electrifications by the overexternal additive and toner scattering, also happen. When coverage exceeds 50% in the examination in this invention besides these, it is in the orientation for development nature to fall in the low concentration section, and, as for coverage, therefore, it is desirable that it is 50% or less. An external additive comes to adhere to a carrier so much for ** outside an excess, this adheres and accumulates this phenomenon in the photo conductor surface at the time of development, and in order that a mold-release characteristic may go up to the degree of pole, it happens.

[0037] Since the image formation process of this example has eliminated blade cleaning, superfluous outside ** which the affix on the surface of a photo conductor is not removed, and causes an affix must avoid. Therefore, as coverage of the external additive on the surface of a toner, it is desirable that it is 15% or more, and it is good more preferably that it is [15% or more] 50% or less.

[0038] Although the external additive was independently used in this example, respectively, it does not restrict to this, and although more than one may be used together, needless to say, coverage serves as the sum total of the coverage of each external additive in that case. Moreover, although hydrophobing processing of the surface was carried out as an external additive, the same effect is acquired, even if the configuration of equipment [as opposed to an environmental variation in the direction / in / considering stability / nearby good better this example] is an example, for example, an imprint electrification machine is not a corona-electrical-charging machine but a roller electrification machine.

[0039] In the image formation equipment which used the development coincidence cleaning process as mentioned above, and installed two or more image formation units successively along with the conveyance belt, by making coverage on the surface of a toner by the external additive into 15% or more, the re-imprint was able to be prevented and the output image of the exact color tone which does not have the fall of color reproduction nature in long-term use was able to be obtained.

[0040]

[A table 1]

被覆率 (%)	再 転 写
0	非常に多い
4.5	非常に多い
6.1	非常に多い
13	多い
15	なし
22	なし

[0041]

[A table 2]

被覆率 (%)	再 転 写
0	非常に多い
3.1	非常に多い
7.2	多い
11	多い
12	多い
15	なし
22	なし

[0042] (Example 2) Drawing 1 is the outline side elevation of the color picture formation equipment in which an example 2 is shown. In the example 1, the color picture was formed by superimposing a direct monochrome toner on imprint material by fixing imprint material electrostatic on the imprint material conveyance belt 10, and passing the image formation section one by one. On the other hand, in this example, the middle imprint object belt 11 which is an image supporter instead of the imprint material conveyance belt 10 of an example 1 was used. Since an equipment configuration will not have an example 1 and the changing place if a middle imprint object is removed, explanation is omitted here. However, as an imprint electrification machine, the roller electrification machine (inside of drawing, 6') is used.

[0043] The image formation process in this example is explained briefly. The toner image formed in each image formation unit forms a color picture in the middle imprint object belt 11 which is an image supporter by carrying out a sequential imprint, and carries out a package imprint on the imprint material which has had this conveyed. Since a transfer residual toner is as little ** on the middle imprint object 11 after an imprint, a cleaner 12 recovers this. Since the outline of image processes other than this is the same as an example 1, explanation is omitted here.

[0044] By using the middle imprint object belt which it could respond to various paper types as imprint material as an image formation process feature using a middle imprint object like this example, and also was set as proper resistance, since it becomes the imprint to the uniform quality of the material without resistance nonuniformity etc. unlike the imprint to imprint material like paper, prevention of high imprint effectiveness and a re-imprint is realizable. Therefore, color mixture is also further reduced rather than an example 1.

[0045] Here, as the above-mentioned middle imprint object belt, what carried out distributed mixing of a conductive carbon particle, the metal powder, etc. is used, for example as a material to polyurethane system resin, polyester system resin, polystyrene system resin, polyolefine system resin, poly-butadiene system resin, polyamide system resin, polyvinyl chloride system resin, polyethylene system resin, fluorine system resin, etc. In this example, the thing which made polyurethane system resin distribute a carbon particle was used.

[0046] As mentioned above, by using a middle imprint object in addition to making coverage by the external additive on the surface of a toner into 15 - 50%, the re-imprint was able to be prevented still more certainly, and the output image without change of the tint by color mixture was able to be continued and obtained.

[0047]

[Effect of the Invention] When the rate of the area covered with the external additive with which the image-formation unit which serves as a cleaning means collect the ** toner particles which remained to the above-mentioned latent-image support is **(ed) by this toner particle outside to the surface area of this toner particle in the image-formation equipment installed successively along with the transferred object considers as 15% or more according to this invention, the color mixture by re-imprint prevents and an image without change of a color tone could maintain.

[two or more]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the outline side elevation of the color picture formation equipment in which the example 2 of this invention is shown.

[Drawing 2] It is the outline side elevation of well-known color picture formation equipment.

[Drawing 3] It is an outline side elevation explaining a well-known development operation.

[Drawing 4] It is the outline side elevation of the color picture formation equipment of **** or an example 1 which takes a development coincidence cleaning method.

[Drawing 5] It is the mimetic diagram of the mode after the imprint which shows behavior of the image support surface potential in a development coincidence cleaning process, and a toner.

[Description of Notations]

1 Photoconductor Drum (Image Support)

2 Primary Electrification Machine

3 Image Aligner

4 Development Counter

5 Drum Cleaner

6 Corona-Electrical-Charging Machine

6' Roller electrification machine

7 Feed Section

8 Fixing Assembly

9 Tray

10 Conveyance Belt

11 Middle Imprint Object Belt

12 Cleaner

P Image formation section (image formation unit)

[Translation done.]

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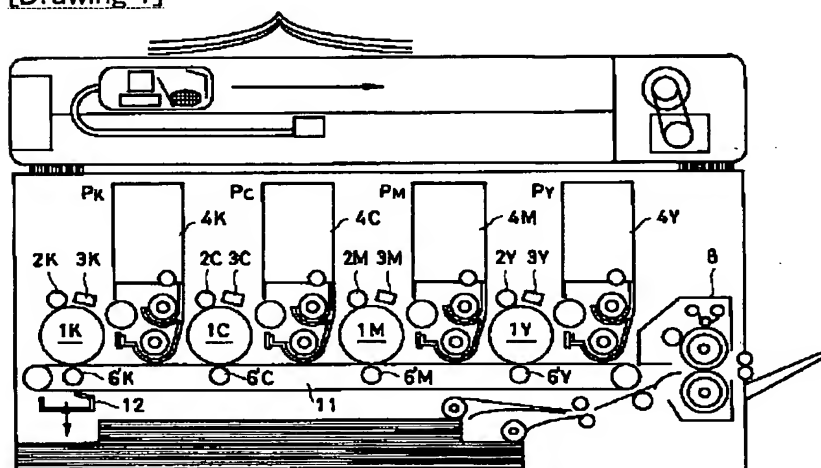
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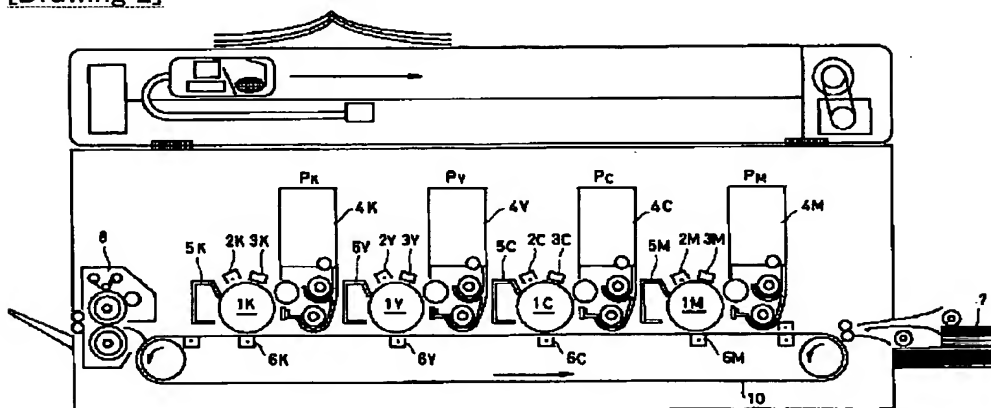
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DRAWINGS

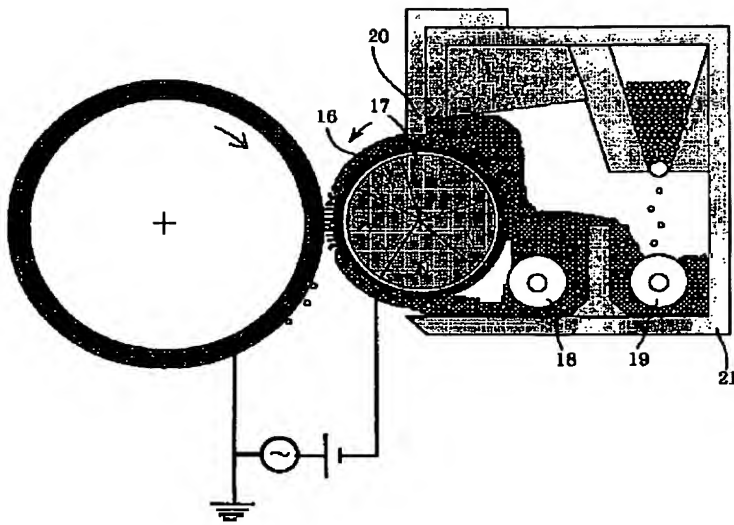
[Drawing 1]



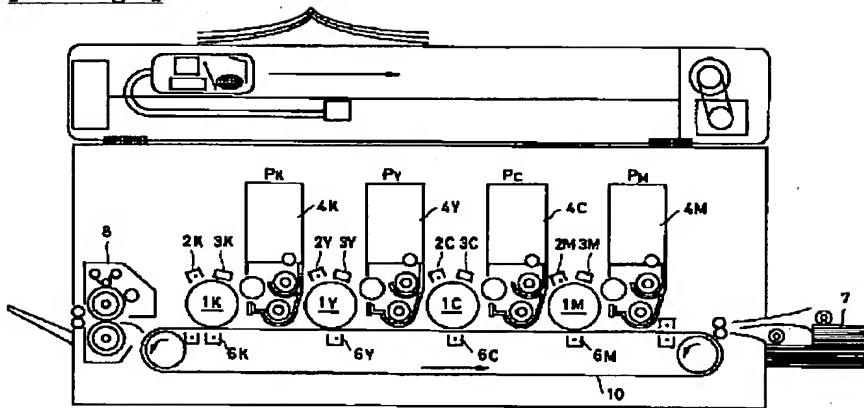
[Drawing 2]



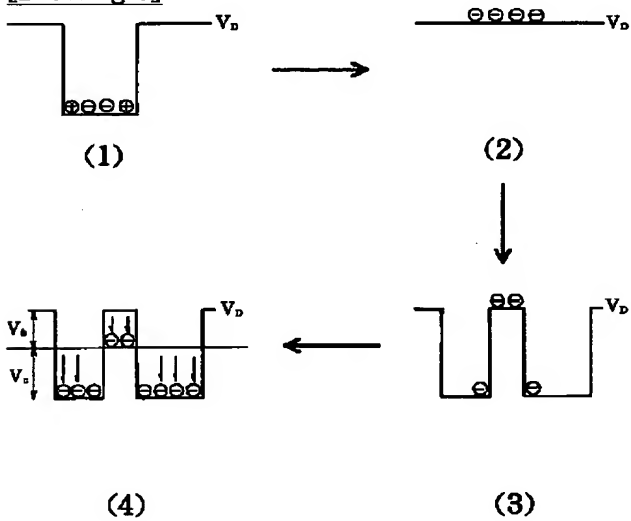
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]

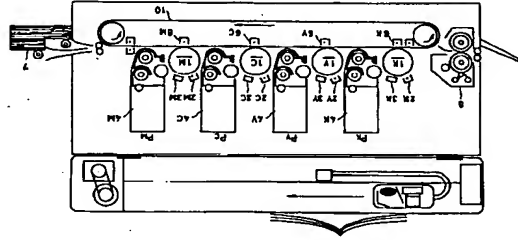
(51)Int.Cl. [*] G 0 3 G	9/08 15/01	識別記号	戸内整理番号	F I	技術表示箇所
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(54)【発明の名称】画像形成装置

(57)【要約】

【目的】 クリーナーレス方式の画像形成装置において発生する再転写による混色を防止し、色調の変化のない画像を維持できる画像形成装置を提供することを目的とする。

【構成】 均一に帯電した像担持体に増感像を形成し、現像剤相持体に担持された球形トナーとキャリア粒子を含む有孔性像段の上に増感像を現像し、該トナー像を転写する有孔性像段４を備え、該現像手段は熱付着性樹脂に転写したあとに該像担持体に残留した熱付着性樹脂粒子を回収するクリーニング手段も兼ねる画像形成ユニットＰが、搬送ベルト１０となつて複數回設置され、該搬送ベルトで転写材を搬送して順次画像形成部を通して各画像を形成する画像形成装置において、該トナー粒子の表面積に対し、該トナー粒子に外添される外添剤による被覆割合が15%以上であることを特徴とする。



【特許請求の範囲】

[illegible]

【請求項2】 該画像形成ユニットが無端状の中間転写本に沿って列設されていることを特徴とする請求項1に記載の画像形成装置。

【請求項3】 該球形トナリの形状係数SF-1が100～140、SF-2が100～120の範囲であることとを特徴とする請求項1又は2に記載の画像形成装置。

【請求項4】 球形状トナナ粒子は重合法によって製造されたものであることを特徴とする請求項1乃至3のいずれかに記載の画像形成装置。

【請求項5】 該トナー粒子の装面積に対し、該トナー粒子に外添される外添剤によって被覆される面積の割合が15%以上50%以下であることを特徴とする請求項1に記載の画像形成装置。

【発明の詳細な説明】

10001

【産業上の利用分野】本発明は被記録画像に対応して像担持体に形成された静電潜像を、現像剤により現像して像用紙等に記録する画像形成装置に関する。

[0002]

[illegible][illegible]

張されている。

【0004】この搬送ベルト10は図示矢印で示す方向に駆動され、前記給紙部を通じて送給される転写材を担持して、前述した各画像形成部 P_M 、 P_C 、 P_Y 及び P_K へと順次搬送する。

【0005】各画像形成部 P_M 、 P_C 、 P_Y 及び P_K は実質的に同一の構成を有し、通常のように図示矢印方向に回転駆動される像担持部である感光ドラム1M、1C、1Y及び1Kを含み、各感光ドラムの周辺には、感光ドラムを一樣帯電する一次帯電器2M、2C、2Y及び2K；感光ドラム上に静電潜像を形成する像露光装置3M、3C、3Y、及び3K；感光ドラム上に形成された静電潜像を現像する現像器4M、4C、4Y及び4K；現像された可現像画像を転写しに転写するコロナ帯電器6M、6C、6Y及び6K；感光ドラム上に残存するトナーを除去するドラムクリーナー5M、5C、5Y及び5K、がドラム回転方向に順次配置されている。

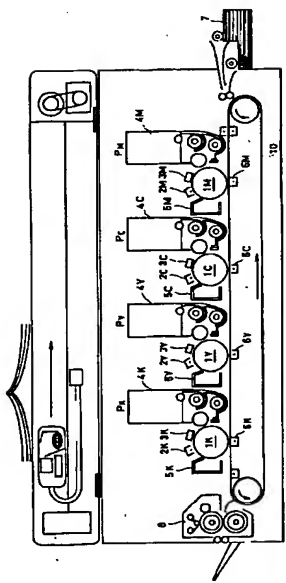
[0006] 現像器4Mにはマゼンタ色のトナーが、現像器4Cにはシアンのトナーが、現像器4Yにはイエロー色のトナーが、現像器4Bには黒色のトナーが、それぞれ収容されている。前記現像装置3M、3C、3Y及び3Kは、本例では、LED発光素子をドラムの母線方向に並べたLEDヘッドであり、カラー用CCDのような撮像素子によって多数の画素に分解されて読み取られ、デジタル信号に変換されたそれぞれの色の画像に対するデジタル画像信号2M、2C、2Y及び2Kと現像器4M、4C、4Y及び4Kとの間でドラム面を露光し、

て、対応する色の静電増倍を形成するようになっている。像光素子 3Mにはカラー一面像のマゼンタ成分像に対応する画素番号が、カラー一面像のイエロー成分像に対応する画素番号が、カラー一面像のシアン成分像に対応する画素番号が、像光素子 3Yに、カラー一面像のイエロー成分像に対応する画素番号が、像光素子 3Kにそれぞれ入力される。また、第一の画像形成部 4Aは、像光素子 3Kに入力される、第一の画像形成部 4Aと給紙部 2との間には、転写帯電電圧を印加する。一方、第四の画像形成部 4Dと定着器 8との間には除菌用帯電電器が設けられており、搬送ベルト 10に吸着されている転写帯電電圧を分離するために電源（図示せず）より交流電圧が印加される。

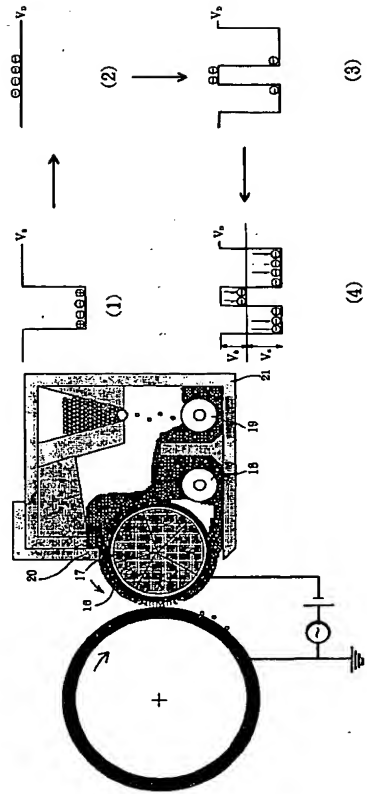
[0007] 上記構成のカラースプリングタにおいて、給電カセツトより搬送ベルト10上と給電された駆写材は、搬送ベルト10の図示矢印方向への移動に伴って搬送される。駆写材の搬送に伴い、第一の画像形成部 P_0 の感光ドラム1Mにはマゼンタのトナー像が、第2の画像形成部 P_2 の感光ドラム1Cにはシア像が、第3の画像形成部 P_3 の感光ドラム1Yにはイエローのトナー像が、第4の画像形成部 P_4 の感光ドラム1Kには黒のトナー像がそれぞれ分離され、

感光ドラム1Kには黒のトナー像がそれぞれ分担され、

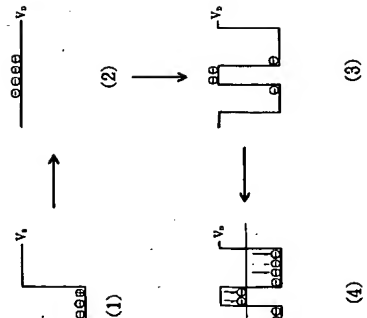
【図2】



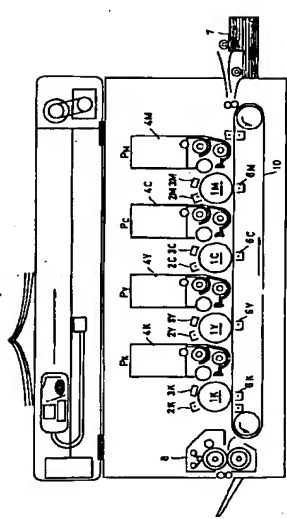
【図3】



【図5】



【図4】



【手続補正書】

【提出日】平成6年12月1日

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】発明の名称

【補正方法】変更

【補正内容】

【発明の名称】画像形成装置

フロントページの続き

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